

Executive Order VR-101-B

Exhibit 5

Pressure Integrity of Drop Tube/Drain Valve Assembly

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer, or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

- 1.1** The purpose of this procedure is to quantify the pressure integrity of a Drop Tube and Drain Valve seal when a drop tube is installed below a Spill Container drain path as shown in Figure 1. This procedure determines compliance with the performance standard(s) for the maximum allowable leakrate for the Spill Container Drain Valve as defined in CP-201 and verifies the zero leak decay limit for a drop tube seal (Drop Tube/Drain Valve Assembly).
- 1.2** This procedure is not applicable to installations that have drop tube overfill protection devices installed.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

- 2.1** A compatible product cap is modified to allow the introduction of nitrogen into a Phase I drop tube. A pressure-measuring device is connected to the modified cap. If the resulting measured nitrogen flowrate necessary to maintain a steady-state pressure of 2.00 inches H₂O is less than, or equal to, the maximum allowable leakrate for the Spill Containment Drain Valve, the assembly is verified to be in compliance.
- 2.2** If the introduction of nitrogen, at a flowrate equal to the maximum allowable leakrate does not result in a steady state pressure that meets, or exceeds, the limits specified in CP-201, the Phase I product adaptor shall be inspected and tested. Any leaks attributable to the Phase I product adaptor shall be corrected and the test repeated to ensure the measured pressure versus flowrate is attributable only to the Drop Tube/Drain Valve Assembly.
- 2.3** If the introduction of nitrogen, at a flowrate equal to the maximum allowable leakrate does not result in a steady state pressure that meets, or exceeds, the limits specified in CP-201 following verification of the Phase I adaptor integrity, the drop tube sealing mechanism shall be inspected and verified for proper seating. Any leaks attributable to the drop tube sealing mechanism shall be corrected and the test repeated to ensure the measured pressure versus flowrate is attributable only to the Spill Container Drain Valve.

3. BIASES AND INTERFERENCES

- 3.1** Missing or defective gaskets on the Phase I product adaptor, or a loose adaptor, may bias the results towards noncompliance. This bias is eliminated by testing the Phase I product adaptor for leaks prior to final determination of the compliance status of the Drop Tube/Drain Valve Assembly.
- 3.2** Product levels less than four (4) inches above the highest opening at the bottom of the submerged drop tube may bias the test toward noncompliance.
- 3.3** Leaks in the test equipment will bias the results toward noncompliance. Prior to conducting the test, this bias is eliminated by conducting a leak check of the test equipment. During the test, this bias is eliminated by using leak detection solution to verify the absence of leaks in the test equipment.

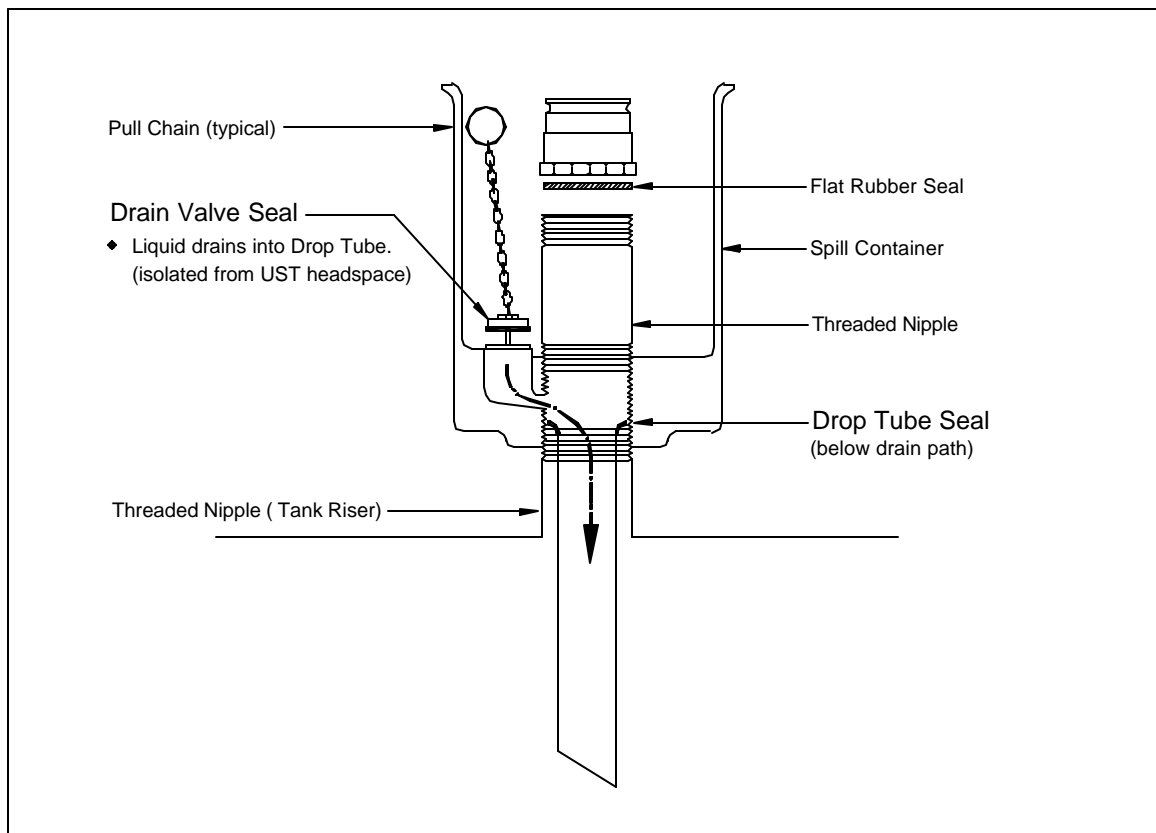
4. SENSITIVITY, RANGE, AND PRECISION

- 4.1** The measurable leakrate is dependent upon the range of the flowmeter used for the test. The recommended flowmeter range specified in Section 5.1 provides sufficient precision at the maximum allowable leakrate defined in CP-201.
- 4.2** The sensitivity of the pressure measuring device is 0.01 inches H₂O for electronic pressure measuring devices and 0.05 inches H₂O for mechanical pressure gauges.

5. EQUIPMENT

- 5.1** Pressure Introduction Assembly. Use a product cap compatible with the Phase I product adaptor. The cap shall be equipped with a pressure tap and flowmeter capable of measuring flowrates equal to the maximum allowable leakrate. The maximum allowable full-scale range for the flowmeter shall be 1.00 CFH. The flowmeter shall be calibrated for use with nitrogen. As a safety precaution, the hose used to feed nitrogen into the assembly shall be steel braided, or a separate grounding strap may be used. An example of a complete Pressure Introduction Assembly is shown in Figure 2. An example of a Product Cap Test Assembly is shown in Figure 3.
- 5.2** Pressure Measuring Device. Use a pressure-measuring device to monitor the pressure in the drop tube.
 - 5.2.1** If an electronic pressure-measuring device is used, the maximum fullscale range of the device shall be 10 inches H₂O. The minimum accuracy shall be 0.5 percent and the pressure measuring device shall be readable to the nearest 0.01 inches H₂O.
 - 5.2.2** If a mechanical pressure-measuring device is used, the maximum fullscale range shall be 5 inches H₂O. The minimum accuracy shall be 1.0 percent and the minimum graduations shall be 0.05 inches H₂O. The minimum diameter of the pressure gauge face shall be 4 inches.

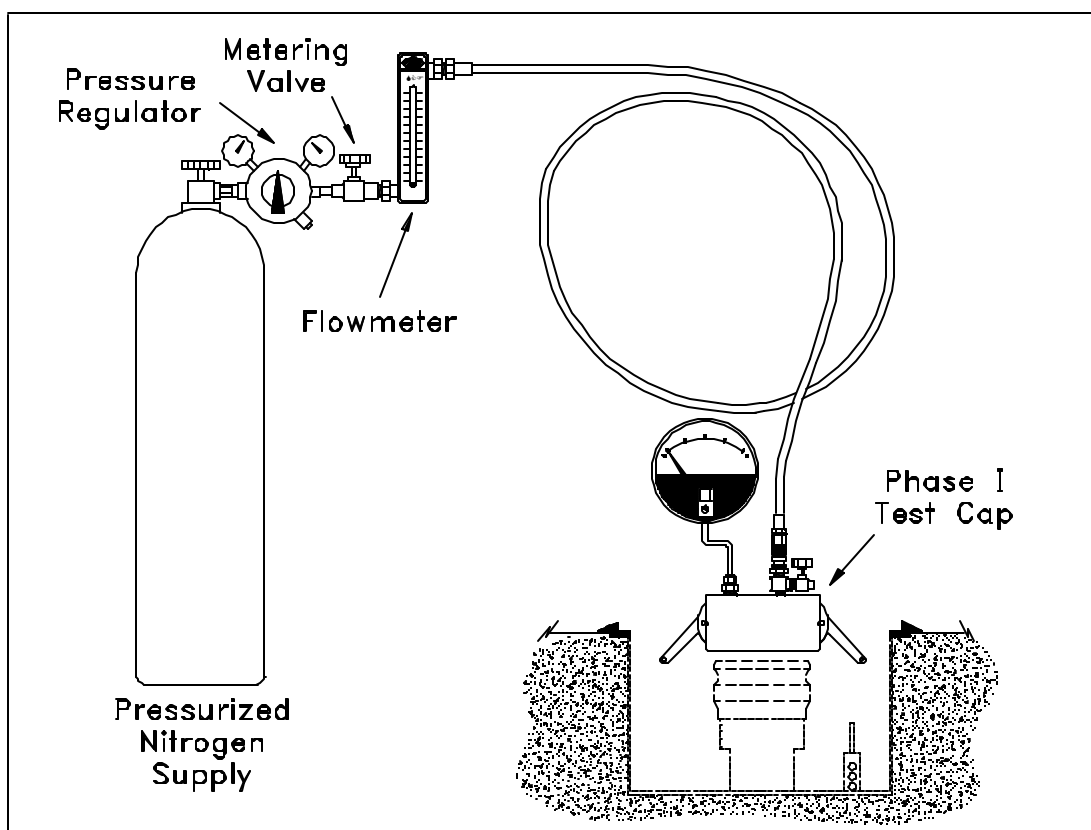
Figure 1
Drop Tube/Drain Valve Assembly



- 5.3** Nitrogen. Use commercial grade gaseous nitrogen in a high-pressure cylinder, equipped with a two-stage pressure regulator and a one psig pressure relief valve.
- 5.4** Stopwatch. Use a stopwatch accurate to within 0.2 seconds to time the duration of the test.
- 5.5** Leak Detection Solution. Any commercial liquid solution designed to detect vapor leaks may be used to verify the pressure integrity of the Phase I product adaptor during this test.
- 5.6** Vapor Poppet Pressure Relief Assembly. Use an assembly to open the Phase I vapor poppet during testing. This will ensure that the underground storage tank (UST) ullage and liquid surface is at zero gauge pressure. An example of a Vapor Poppet Pressure Relief Assembly is shown in Figure 3.

- 5.7** Traffic Cones. Use traffic cones to encircle the area containing the Phase I spill containers while the test is being conducted.
- 5.8** Tank Gauging Stick. Use a tank gauging stick of sufficient length to verify that the UST liquid level is at least four (4) inches above the highest opening at the bottom of the submerged drop tube. The tank gauging stick shall be equipped with a non-sparking “L” bracket at the end.

Figure 2
Pressure Introduction Assembly



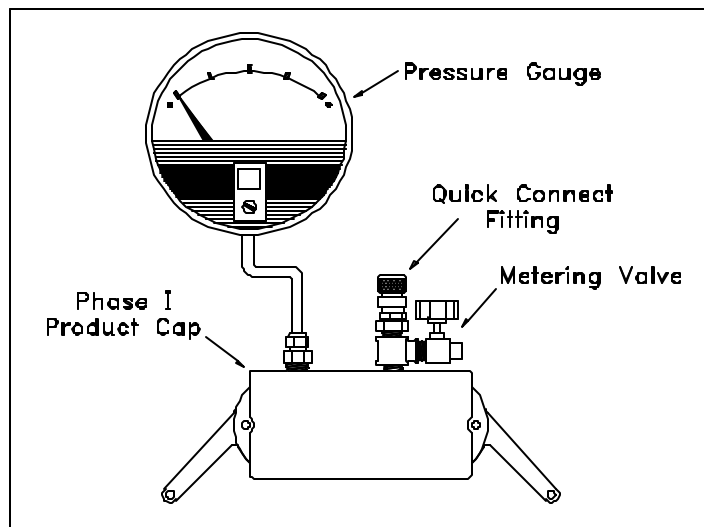
4. PRE-TEST PROCEDURES

The flowmeter and pressure-measuring device shall be calibrated within the 180 days prior to conducting the test. The flowmeter(s) shall be calibrated for use with nitrogen. Calibrations shall be conducted in accordance with EPA or CARB protocols. **CARB calibration methodology for flow meters are contained in Appendix D of Air Monitoring Quality Assurance, Volume VI, Standard Operating Procedures for Stationary Source Emission Monitoring and Testing, January 1979.**

- 6.2** Place the traffic cones around the perimeter of the Phase I Spill Containers, allowing sufficient space to safely conduct the test.

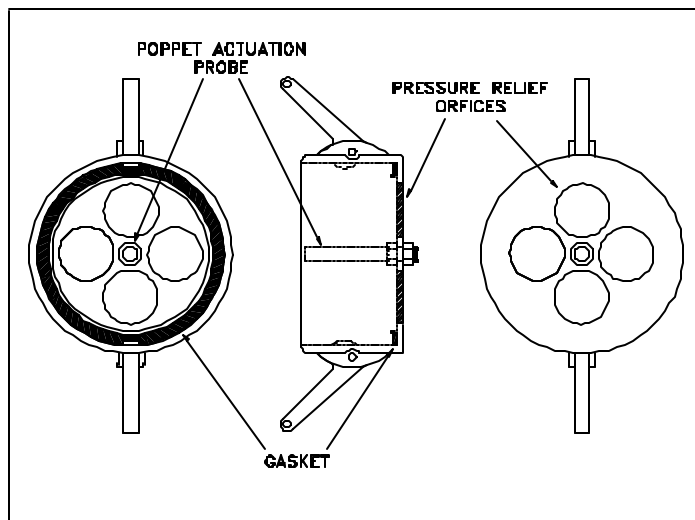
- 6.3** Remove the lids of the Phase I Spill Containers. Visually determine that the drop tube is installed below the Spill Container and that the drain path allows liquid to drain directly into the drop tube.

Figure 3
Product Cap Test Assembly



- 6.4** Inspect the Phase I product adaptor to ensure that the gasket is intact and that the adaptor is securely attached to the Phase I product stem.
- 6.5** Verify that the liquid level in the storage tank is at least four (4) inches above the highest opening at the bottom of the submerged drop tube. This may be accomplished by using a tank gauging stick equipped with a non-sparking "L" bracket on the end.

Figure 4
Vapor Poppet Pressure Relief Assembly



7. TEST PROCEDURE

- 7.1** Connect the Pressure Introduction Assembly to the Phase I product adaptor as shown in Figure 1. Connect the nitrogen supply line to the inlet of the flowmeter.
- 7.2** Connect the Vapor Poppet Pressure Relief Assembly to the Phase I vapor poppet to bring the UST headspace to atmospheric pressure.
- 7.3** With no vehicle refueling occurring, open the nitrogen supply and adjust the nitrogen flowrate to at least three times the maximum allowable leakrate specified in CP-201, and start the stopwatch.
- 7.4** Wait until the pressure measuring device records a pressure between 2.00 and 2.20 inches H₂O.
 - 7.4.1** If the pressure does not reach at least 2.00 inches H₂O within 180 seconds, the Drop Tube/Drain Valve Assembly does not comply with the maximum allowable leakrate.
 - 7.4.2** If the pressure reaches at least 2.00 inches H₂O, reduce the introduction of nitrogen to the allowable leakrate specified in CP-201. Wait until the pressure reaches steady state conditions for at least ten (10) seconds and record both the nitrogen flowrate and the steady state pressure. If the steady state pressure is less than 2.00 inches H₂O, the Drop Tube/Drain Valve Assembly does not comply with the maximum allowable leakrate.
 - 7.4.2.1.1** In the case of a Drop Tube/Drain Valve Assembly not reaching the minimum specified pressure, use a soap solution on the rotatable adaptor to ensure that the rotation mechanism or the adaptor seal is not leaking.
 - 7.4.2.1.2** In the case of a Drop Tube/Drain Valve Assembly not reaching the minimum specified pressure following verification of the rotatable adaptor mechanism, ensure that the drop tube seal is properly tightened according to the manufacturers recommended installation instructions.

8. POST-TEST PROCEDURES

- 8.1** Remove the Pressure Introduction Assembly and the Vapor Poppet Pressure Relief Assembly from the Phase I connections. Replace the caps on the appropriate Phase I adaptors, and the lids on the appropriate Spill Containers.
- 8.2** Remove the traffic cones from the Phase I area.
- 8.3** If the steady-state pressure, at a nitrogen flowrate rate equal to the allowable leakrate, was not equal to or greater than 2.00 inches H₂O, Equation 9-1 may be used to determine the leakrate at 2.00 inches H₂O.

9. CALCULATING RESULTS

- 9.1** If the flowrate of Nitrogen was at the upper limit of the flowmeter and the measured pressure never reached 2.00 inches H₂O, but was greater than 0.0 inches H₂O, the actual leakrate at a pressure of 2.00 inches H₂O shall be calculated as follows:

$$Q_{2.00} = (2.00)^{1/2} \left[\frac{Q_{actual}}{(P_{actual})^{1/2}} \right] \quad \text{Equation 9-1}$$

Where:

- $Q_{2.00}$ = The leakrate of the drop tube assembly at 2.00 inches H₂O, cubic feet per hour
 Q_{actual} = The actual introduction rate of nitrogen, cubic feet per hour
 P_{actual} = The actual measured steady-state pressure at Q_{actual} , inches H₂O
2.00 = Pressure, inches H₂O

10. REPORTING RESULTS

- 10.1** Report the results of the quantification of the leakrate through the Drop Tube/Drain Valve Assembly as shown on Form 1. Districts may require the use of alternate Drop Tube/Drain Valve Assembly data sheets provided they include the same parameters identified on Form 1.

11. ALTERNATE PROCEDURES

- 11.1** This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the CARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Form 1**Field Data Sheet****Pressure Integrity Of Drop Tube/Drain Valve Assembly**

Facility:	Test Date:	Tester(s):
Address:	City:	Zip Code:
Phase I System Type:	Phase II System Type:	
Date of Last Flowmeter Calibration:	Date of Last Pressure Device Calibration:	

Test Results

Product Grade	Nitrogen Flowrate (CFH)	Pressure (inches H ₂ O)	Make/Model Spill Container	Make/Model Rotatable Product Adaptor	Make/Model Rotatable Vapor Adaptor

<i>Comments:</i>